CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification									DATE: February 2003		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**						R-1 ITEM NOMENCLATURE PE 0603207N Air/Ocean Tactical Applications					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Total PE Cost	**86.560**	**30.415**	**33.036**	**22.832**	**24.978**	**25.683**	**31.034**	**31.537**	**32.658**	**Continuing**	**Continuing**
X2341 METOC Data Acquisition	**23.671**	**8.561**	**9.823**	**7.896**	**8.627**	**8.851**	**10.697**	**10.877**	**11.063**	**Continuing**	**Continuing**
X2342 METOC Data Assimilation and Modeling	**37.066**	**12.829**	**12.479**	**7.222**	**7.966**	**8.212**	**9.904**	**10.032**	**10.770**	**Continuing**	**Continuing**
X2343 Tactical METOC Applications	**21.615**	**7.606**	**8.068**	**6.553**	**7.120**	**7.318**	**8.857**	**9.022**	**9.189**	**Continuing**	**Continuing**
X2344 Precise Timing and Astrometry	**4.208**	**1.419**	**1.443**	**1.161**	**1.265**	**1.302**	**1.576**	**1.606**	**1.636**	**Continuing**	**Continuing**
X9168 Prototype Regional Forecast Hub	**0.000**	**0.000**	**1.223**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**1.223**
											0.000
Quantity of RDT&E Articles											**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Air Ocean Tactical Applications (AOTA) Program Element is specifically tailored to emphasize techniques which expand knowledge and improve understanding of the meteorological and oceanographic (METOC) environment and its impact on combat systems performance. AOTA focuses on shallow water and other harsh environments, and regional conflict and crisis response scenarios. Projects in this program element develop atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in both mainframe and tactical scale computers. Global Geospatial Information and Services efforts within this program address the bathymetric and gravimetric needs of the Navy. Also developed are algorithms to process remotely sensed satellite data for integration into other systems and tactical applications. In addition, the projects provide for demonstration and validation of specialized METOC instrumentation and measurement techniques, new sensors, communications and interfaces. Included are techniques to assess, predict and enhance the performance of current and proposed undersea surveillance, tactical and mine warfare and weapons systems. AOTA METOC products are tailored for, and will be incorporated into the Global Command and Control System/Maritime (GCCS/M) and/or onboard combat systems to provide accurate operational system performance predictions. These METOC products will also be incorporated into fleet trainers to provide realistic environments in support of warfare simulations. Finally, this project upgrades the accuracy of the U.S. Naval Observatory's Master Clock system; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates systems for experimental test related to specific ship or aircraft applications**.** A congressional plus up for Prototype Regional Forecast (PRF) Hub is provided for FY03.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications					PROJECT NUMBER AND NAME X2341 METOC Data Acquisition					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Project Cost	**23.671**	**8.561**	**9.823**	**7.896**	**8.627**	**8.851**	**10.697**	**10.877**	**11.063**	**Continuing**	**Continuing**
RDT&E Articles Qty											**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The major thrust of the meteorology and oceanography (METOC) Data Acquisition Project is to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander. As the emphasis on Naval Warfare has evolved from blue water operations to the littoral and hinterland battlespace, METOC data requirements have likewise evolved. The littoral and hinterland regions are extremely dynamic and complex, characterized by strong and highly variable oceanographic and atmospheric conditions. As a result, the need to accurately characterize these parameters is more crucial than ever in planning and executing Amphibious Warfare, Mine Warfare, Special Operations, Anti-Submarine Warfare, and Strike Warfare operations. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models, and satellite remote sensing are inadequate to support these warfare areas in the littoral and hinterland regions. Current operational sensors, such as the standard balloon launched radiosonde, are deployed from platforms that are frequently located great distances from the area of interest. The principal challenge is to provide a means for the collection and dissemination of METOC data in highly variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time. The principal goals of this project are to: 1) Provide the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provide an on-scene assessment capability for the tactical commander; 3) provide the tactical commander with real-time METOC data and products for operational use; 4) demonstrate and validate the use of tactical workstations and desktop computers for processing and display of METOC data and products using latest networking technologies; 5) demonstrate and validate techniques which employ data compression, connectivity and interface technologies to ingest, store, process, distribute and display these METOC data and products; 6) develop new charting and bathymetric survey techniques necessary to reduce the existing 300 ship year shortfall in coastal hydrographic survey requirements; and, 7) develop an expanded database for predictive METOC models in areas of potential interest.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

UAV Sensors	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.229	1.230	0.972	1.263
RDT&E Articles Quantity				

FY02 - Completed sensor integration and development of UAV sensors in Tier II Plus Vehicles. Began development of sensor suite for Global Hawk (previously called "Tier III") Vehicles.
FY03 - Continue development of sensor suite for Global Hawk UAV.
FY04 - Complete development of sensor suite for Global Hawk UAV. Spiral development of miniaturized UAV sensor suites for mini/micro UAV platforms.
FY05 - Continue development of miniaturized sensor suites for mini/micro UAV platforms.

Acoustic Data Inversion	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.175	1.590	1.241	1.349
RDT&E Articles Quantity				

FY02 - Continued assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
FY03 - Continue assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
FY04 - Continue assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
FY05 - Complete assessments of temporal and spatial variability of littoral environments for acoustic data inversion. Spiral development of advanced acoustic data inversion techniques incorporating Expert System technology.

Ambient Noise Data	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.065	1.340	1.071	1.230
RDT&E Articles Quantity				

FY02 - Continued development of advanced techniques to acquire and manage ambient noise data.
FY03 - Continue development of advanced techniques to acquire and manage ambient noise data.
FY04 - Continue development of advanced techniques to acquire and manage ambient noise data.
FY05 - Continue development of advanced techniques to acquire and manage ambient noise data.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Autonomous Clandestine Sensors	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.068	1.292	1.062	1.320
RDT&E Articles Quantity				

FY02 - Began development of autonomous clandestine sensors for measurements in denied areas.
FY03 - Continue development of autonomous clandestine sensors for measurements in denied areas.
FY04 - Complete development of autonomous clandestine sensors for measurements in denied areas. Spiral development of next-generation autonomous clandestine sensors for data acquisition in denied areas.
FY05 - Continue development of next-generation autonomous clandestine sensors for data acquisition in denied areas.

Data Connectivity	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.280	1.320	1.071	1.225
RDT&E Articles Quantity				

FY02 - Completed development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0). Continued development of data connectivity with GCCS/M. Began development of data connectivity with Joint C4ISR.
FY03 - Continue development of data connectivity with GCCS/M and Joint C4ISR.
FY04 - Complete development of data connectivity with GCCS/M. Continue development of data connectivity with Joint C4ISR.
FY05 - Complete development of data connectivity with Joint C4ISR. Spiral development of data connectivity methods for next-generation command and control systems.

Acoustic Data Acquisition	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.724	1.901	1.581	1.144
RDT&E Articles Quantity				

FY02 - Continued development of next-generation acoustic data acquisition techniques.
FY03 - Complete development of next-generation acoustic data acquisition techniques. Spiral development of advanced technology through the sensor data acquisition techniques.
FY04 - Continue development of advanced technology through the sensor data acquisition techniques.
FY05 - Complete development of advanced technology through the sensor data acquisition techniques. Spiral development of expert system acoustic data acquisistion techniques to directly ingest data obtained from tactical sensors.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

DMAP	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.020	1.150	0.898	1.096
RDT&E Articles Quantity				

FY02 - Continued information management and Digital Mapping Charting Geodesy Analysis Program (DMAP) functions.
FY03 to FY05 - Continue information management and DMAP functions.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost				
RDT&E Articles Quantity				

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost				
RDT&E Articles Quantity				

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2341 METOC Data Acquisition

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2002	FY 2003	FY 2004	FY 2005
President's Budget	9.180	10.050		
Current BES/President's Budget	8.561	9.823	7.896	8.627
Total Adjustments	-0.619	-0.227		
Summary of Adjustments				
Sec. 313. PL 107-206: Revised Economic Assumption	(0.019)			
Business Process Reform (SEC. 8100)	-	(0.040)		
Economic Assumptions (SEC. 8135)	(0.024)	(0.056)		
IT Cost Growth (SEC. 8109)	-	(0.018)		
FY03 FFRDC reduction Sec. 8029, P.L. 107-248	-	(0.006)		
Miscellaneous Department Adjustments	(0.363)	(0.107)		
FY 2002 SBIR	(0.132)	-		
Sec 8123 Management Reform Initiative	(0.081)	-		
Subtotal	-0.619	-0.227		

(U) Schedule:

Not applicable.

(U) Technical:

Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2341 METOC Data Acquisition

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP onboard selected ships and shore sites.

(U) E. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the meteorology and oceanography (METOC) Data Acquisition Project to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander, all with management oversight by SPAWAR Headquarters.

(U) F. MAJOR PERFORMERS:

N/A

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2341 METOC Data Acquisition						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software Development	WX	NRL	14.523	3.400	N/A	3.940	N/A	4.470	N/A	CONT	CONT	
	WX	NAWC-AD Lake	0.923	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
	CP	ARL/APL	3.786	0.218	N/A	0.350	N/A	0.400	N/A	CONT	CONT	
	WX	NSWC	1.627	0.400	N/A	0.275	N/A	0.300	N/A	CONT	CONT	
	CP	New Age	0.783	1.095	N/A	0.650	N/A	0.705	N/A	CONT	CONT	
	CP	PSI/R.L.Phillips	0.545	0.560	N/A	0.450	N/A	0.500	N/A	CONT	CONT	
	CP	Neptune	0.690	0.350	N/A	0.375	N/A	0.400	N/A	CONT	CONT	
	WX	FNMOC	1.145	0.516	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
	N/A	MISC	7.042	3.284	N/A	1.726	N/A	1.717	N/A	CONT	CONT	
											0.000	
											0.000	
Subtotal Software Development			31.064	9.823		7.766		8.492		CONT	CONT	

Remarks:

Systems Engineering	CP	SSA	1.395	0.000	N/A	0.130	N/A	0.135	N/A	CONT	CONT	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			1.395	0.000		0.130		0.135		CONT	CONT	

Remarks:

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2341 METOC Data Acquisition						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			32.459	9.823		7.896		8.627		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

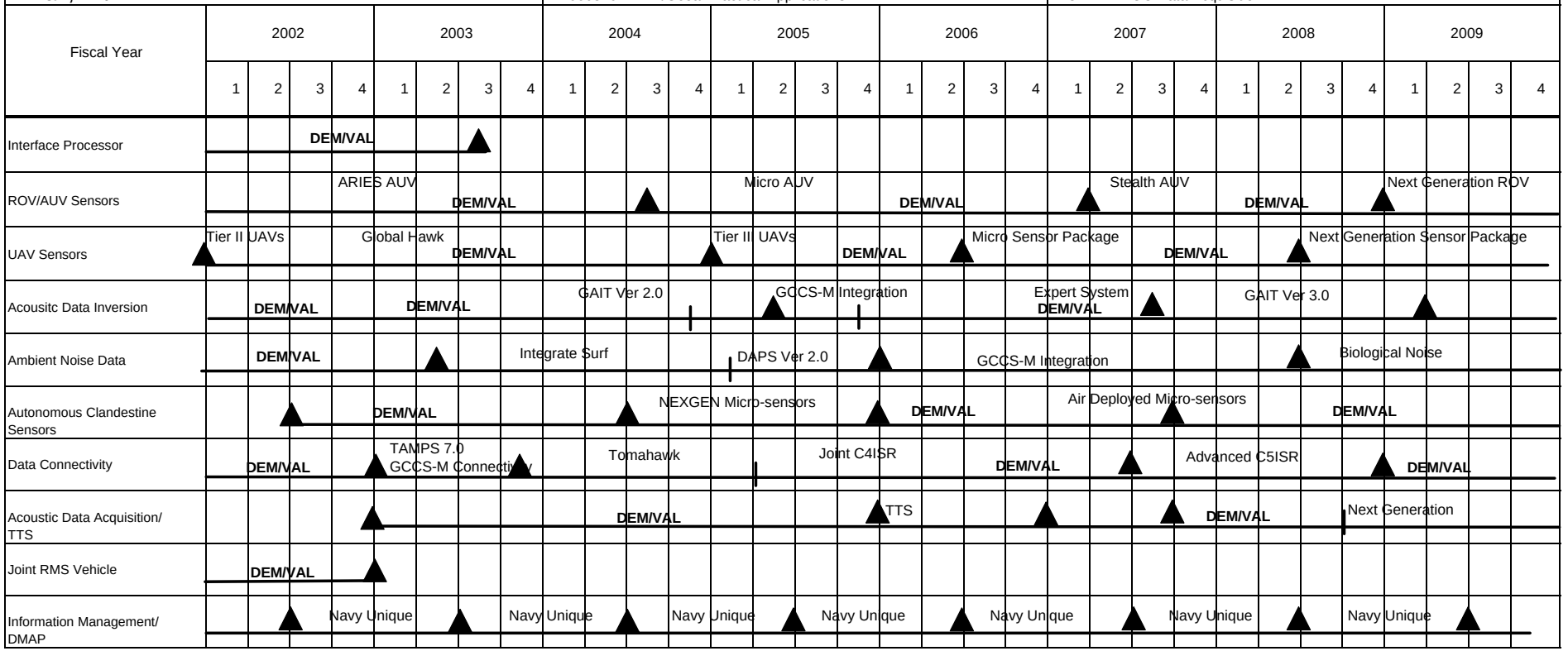
CLASSIFICATION:

EXHIBIT R4, Schedule Profile | DATE: **February 2003**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-4**

PROGRAM ELEMENT NUMBER AND NAME: PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME: X2341 METOC Data Acquisition



R-1 SHOPPING LIST - Item No. 35

* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2341 METOC Data Acquisition			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Interface Processor		3Q						
ROV/AUV Sensors			3Q			1Q	4Q	
UAV Sensors	1Q		4Q		2Q		2Q	
Acoustic Data Inversion				2Q		3Q		1Q
Ambient Noise Data		2Q		4Q			2Q	
Autonomous Clandestine Sensors	2Q		2Q	4Q		3Q		
Data Connectivity	4Q	4Q				2Q	4Q	
Acoustic Data Acquisition/TTS	4Q			4Q	4Q	3Q		
Joint RMS Vehicle	4Q							
DMAP	2Q	2Q	2Q	2Q	2Q	2Q	2Q	2Q

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications					PROJECT NUMBER AND NAME X2342 METOC Data Assimilation and Modeling					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Project Cost	**37.066**	**12.829**	**12.479**	**7.222**	**7.966**	**8.212**	**9.904**	**10.032**	**10.770**	**Continuing**	**Continuing**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The meteorological and oceanographic (METOC) Data Assimilation Project is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers. Included are numerical oceanographic and atmospheric models for the Large Scale Computers at the Navy Fleet Numerical Meteorology and Oceanography Center, Monterey, CA and the Naval Oceanographic Office, Stennis Space Center, MS. These models, combined with a global communications network for data acquisition and distribution, form a prediction system which provides METOC data and products necessary to support naval operations worldwide in virtually every mission area; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder. These techniques allow for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite? borne sensors. Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. As weapons and sensors become more sophisticated and complex, the marine environment has an increasingly significant impact on system performance. Operational limitations induced by the ocean and atmosphere must be understood, and the resulting constraints on mission effectiveness and system employment minimized. Hence, the operating forces require more accurate worldwide forecasts of METOC conditions with increased temporal and spatial resolution. An additional challenge is posed by the emergence of new satellite sensors, which are continually adding new sources of disparate data types. In order to fully exploit this dynamic and massive volume of data, modern data base management systems (DBMS) are required, and must be tailored for individual computer configurations. Improved representation of smaller-scale phenomena, particularly in the littoral, is also an important consideration.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Modeling and Simulation	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.436	1.360	0.715	0.920
RDT&E Articles Quantity				

FY02 - Continued modeling and simulation of atmosphere and ocean environmental effects on Navy systems.
FY03 - Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems.
FY04 - Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems.
FY05 - Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems.

Coupled Data Assimilation	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.156	1.280	0.320	0.440
RDT&E Articles Quantity				

FY02 - Continued development of variational techniques for coupled assimilation.
FY03 - Continue development of variational techniques for coupled assimilation.
FY04 - Complete development of variational techniques for coupled assimilation. Spiral development of coupled data assimilation techniques incorporating Artificial Intelligence.
FY05 - Continue development of coupled assimilation techniques incorporating Artificial Intelligence.

Fleet Exercises	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.635	0.650	0.524	0.530
RDT&E Articles Quantity				

FY02 - Participated in selected fleet exercises and demonstrations
FY03 - Participate in selected fleet exercises and demonstrations.
FY04 - Participate in selected fleet exercises and demonstrations.
FY05 - Participate in selected fleet exercises and demonstrations.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

High-Resolution Forecast Models	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.367	1.446	0.681	0.824
RDT&E Articles Quantity				

FY02 - Continued development of next generation high-resolution coupled air/ocean forecast models.
FY03 - Continue development of next generation high-resolution coupled air/ocean forecast models.
FY04 - Continue development of next generation high-resolution coupled air/ocean forecast models.
FY05 - Continue development of next generation high-resolution coupled air/ocean forecast models.

Basin Scale Ocean Models	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.370	1.363	1.100	1.260
RDT&E Articles Quantity				

FY02 - Continued development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
FY03 - Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
FY04 - Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
FY05 - Complete development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements. Spiral development of coupled air/ocean models for selected geographical locations in response to emergent requirements.

Data Assimilation	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.105	1.120	0.327	0.410
RDT&E Articles Quantity				

FY02 - Began development of new capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using Artificial Intelligence techniques.
FY03 to FY05 - Continue development of new capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using Artificial Intelligence techniques.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Automated Objective Processing	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.375	1.540	1.124	0.976
RDT&E Articles Quantity				

FY02 - Continued development of techniques for bathymetry and surf zone and high-resolution micro-topography algorithms and automated objective processing in the littoral.
FY03 - Continue development of techniques for bathymetry and surf zone and high-resolution micro-topography algorithms and automated objective processing in the littoral.
FY04 - Complete development of techniques for bathymetry and surf zone and high-resolution micro-topography algorithms and automated objective processing in the littoral. Spiral development of assimilation methods for high-resolution surf zone bathymetry into coupled air/ocean forecast models and automated objective preocessing in the littoral.
FY05 - Continue development of assimilation methods for high-resolution surf zone bathymetry into coupled air/ocean forecast models.

Tide/Surf Data Visualization	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.260			
RDT&E Articles Quantity				

FY02 - Completed development of shipboard shallow water ocean circulation model, next generation tide and surf models, and automated graphical applications for tactical data visualization.

NEXGEN Acoustive Models	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.085	1.260	0.978	1.170
RDT&E Articles Quantity				

FY02 - Continued development of next-generation active and passive acoustic models.
FY03 - Continue development of next-generation active and passive acoustic models.
FY04 - Continue development of next-generation active and passive acoustic models.
FY05 - Continue development of next-generation active and passive acoustic models.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Shallow Water Acoustics	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.035	1.245	0.838	0.750
RDT&E Articles Quantity				

FY02 - Continued the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
FY03 - Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
FY04 - Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
FY05 - Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.

Fleet Applications and Data V&V	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.005	1.215	0.615	0.686
RDT&E Articles Quantity	velopment of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.			

FY02 - Continued the verification and validation of products and data assimilation techniques developed for fleet applications.
FY03 - Continue the verification and validation of products and data assimilation techniques developed for fleet applications.
FY04 - Continue the verification and validation of products and data assimilation techniques developed for fleet applications.
FY05 - Continue the verification and validation of products and data assimilation techniques developed for fleet applications.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost				
RDT&E Articles Quantity				

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2002	FY 2003	FY 2004	FY 2005
President's Budget	13.591	12.768		
Current BES/President's Budget	12.829	12.479	7.222	7.966
Total Adjustments	-0.762	-0.289		
Summary of Adjustments				
Sec. 313. PL 107-206: Revised Economic Assumption	(0.029)			
Business Process Reform (SEC. 8100)		(0.051)		
Economic Assumptions (SEC. 8135)	(0.037)	(0.072)		
IT Cost Growth (SEC. 8109)		(0.023)		
FY03 FFRDC reduction Sec. 8029, P.L. 107-248		(0.008)		
Miscellaneous Department Adjustments	(0.429)	(0.135)		
Sec 8123: Management Reform Inititative	(0.120)			
FY 2002 SBIR	(0.147)			
Subtotal	-0.762	-0.289		

(U) Schedule:

Not applicable.

(U) Technical:

Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2342 METOC Data Assimilation and Modeling

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable.

(U) E. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies to support the meteorological and oceanographic (METOC) Data Assimilation Project which is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products, all with management oversight by SPAWAR.

(U) F. MAJOR PERFORMERS:

N/A

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME X2342 METOC Data Assimilation and Modeling						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software Development	WX	NRL	35.550	9.619	N/A	5.654	N/A	6.363	N/A	CONT	CONT	
	WX	NAWC-WD, Pax	1.335	0.000	N/A	0.185	N/A	0.208	N/A	CONT	CONT	
	PD	APL	0.290	0.487	N/A	0.208	N/A	0.290	N/A	CONT	CONT	
	Grant	Univ. S. Miss.	2.413	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
	CP	Neptune	0.381	0.325	N/A	0.295	N/A	0.325	N/A	CONT	CONT	
	CP	New Age	0.400	0.000	N/A	0.300	N/A	0.325	N/A	CONT	CONT	
	N/A	MISC	9.589	2.048	N/A	0.580	N/A	0.455	N/A	CONT	CONT	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Software Development			49.958	12.479		7.222		7.966		CONT	CONT	
Remarks:												
Systems Engineering	CP	SSA	0.295	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			0.295	0.000		0.000		0.000		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2342 METOC Data Assimilation and Modeling						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			50.253	12.479		7.222		7.966		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

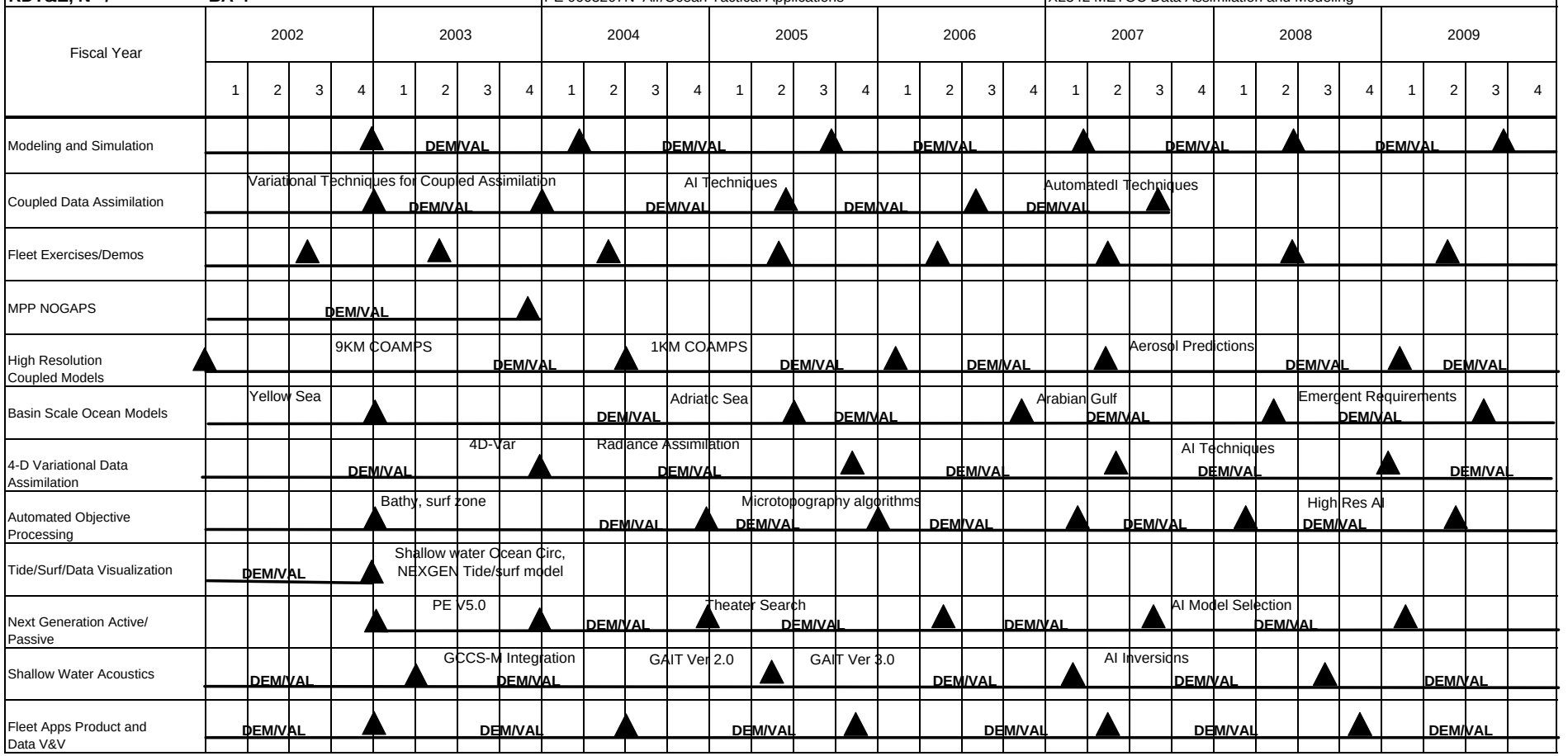
CLASSIFICATION:

EXHIBIT R4, Schedule Profile | DATE: **February 2003**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-4**

PROGRAM ELEMENT NUMBER AND NAME: PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME: X2342 METOC Data Assimilation and Modeling



R-1 SHOPPING LIST - Item No. 35

* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2342 METOC Data Assimilation and Modeling			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Modeling and Simulation	4Q		1Q	3Q		1Q	2Q	3Q
Coupled Data Assimilation	4Q	4Q		2Q	3Q	3Q		
Fleet Exercises/Demonstrations	3Q	2Q	2Q	2Q	2Q	2Q	2Q	2Q
MPP NOGAPS		4Q						
High-Resolution Coupled Models	1Q		2Q		1Q	2Q		1Q
Basin Scale Ocean Models	4Q			2Q	4Q		2Q	3Q
4D-VAR Data Assimilation		4Q		4Q		2Q		1Q
Automated Objective Processing	4Q		4Q	4Q		1Q	1Q	2Q
Tide/Surf/Data Visualization	4Q							
NEXGEN Active and Passive Acoustic Models	4Q	4Q	4Q		2Q	3Q		1Q
Shallow Water Acoustics		1Q		2Q		1Q	3Q	
Fleet Applications and Data V&V	4Q		2Q	4Q		2Q	4Q	

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications					PROJECT NUMBER AND NAME X2343 Tactical METOC Applications					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Project Cost	**21.615**	**7.606**	**8.068**	**6.553**	**7.120**	**7.318**	**8.857**	**9.022**	**9.189**	**Continuing**	**Continuing**
RDT&E Articles Qty											**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The METOC Data Applications project is a continuing effort to develop and field state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments. These assessments allow mission planners and warfighters, from the unit to theater level, to tactically optimize sensor employment on airborne, surface, and subsurface platforms in support of all Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), and Special Warfare. Emphasis is placed on products to support littoral and regional conflict scenarios. Performance assessments leading to improvements in tactical control are conducted through a two-tiered approach: 1) METOC Decision Aids (MDAs); and, 2) Tactical Decision Aids (TDAs). MDAs consist of a series of analysis tools which characterize the electromagnetic (EM), electro-optical (EO), atmospheric, oceanographic, and acoustical properties of the battlespace based on the best environmental scene description available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ data. TDAs, also developed under this project, then use this information to predict how various weapons and sensor systems will perform given the current METOC conditions, and present these predictions in various tabular and graphic formats used by mission planners and combat/weapon system operators to develop ASW and MIW search and localization plans, USW/AAW/ASUW screens, STW profiles, AMW ingress and egress points, and other considerations. Project X2343 MDAs and TDAs use data obtained by sensors developed in Project X2341 (METOC Data Acquisition) and assimilated by software produced by Project X2342 (METOC Data Assimilation and Modeling), also contained in this Program Element. They also used data obtained through direct interfaces to the combat systems. A current emphasis area of the project is the development of new combat system and mine warfare performance prediction and MDA/TDA capabilities required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly Mine Warfare, shallow water ASW, and missile and air defense/strike capabilities.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2343 Tactical METOC Applications

(U) B. Accomplishments/Planned Program

EM/EO Decision Aids	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.131	1.334	1.015	1.180
RDT&E Articles Quantity				

FY02 - Completed development of next generation Electro-optical decision aids. Continued development of an advanced electromagnetic propagation model incorporating artificial intelligence techniques.
FY03 -04 Continue development of an advanced electromagnetic propagation model incorporating artificial intelligence techniques. Continue spiral development of an advanced electro-optical decision aid incorporating artificial intelligence techniques.
FY05 - Complete development of an advanced electro-optical decision aid incorporating artificial intelligence techniques. Spiral development of next generation electromagnetic and electro-optical (EM/EO) performance prediction systems and applications.

Mine Littoral Warfare TDAs	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	2.648	2.664	2.244	2.307
RDT&E Articles Quantity				

FY02 Continued to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Continued to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.
FY03-04 Continue to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Continued to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.
FY05 - Complete the incorporation of prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Spiral development to incorporate additional mine littoral warfare decision aids in applicable performance prediction systems. Continue to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.

TDA COTS Visualization	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.625	1.795	1.356	1.562
RDT&E Articles Quantity				

FY02 - Continued to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrated into appropriate platform ADMs. Performed at-sea evaluation of new capabilities.
FY03-04 - Continue to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADMs. Perform at-sea evaluation of new capabilities.
FY05 - Complete the application of advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance. Spiral development of multi-dimensional TDA COTS visualization techniques and integrate into appropriate platform ADMs. Perform at-sea evaluation of new capabilities.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2343 Tactical METOC Applications

(U) B. Accomplishments/Planned Program

Platform Vulnerability	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.115	1.125	0.988	1.000
RDT&E Articles Quantity				

FY02 - Continued to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADMs to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.
FY03-05 - Continue to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADMs to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.

Sensor Interface Capabilities	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.087	1.150	0.950	1.071
RDT&E Articles Quantity				

FY02 - Continued to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADMs and evaluate at-sea.
FY03 - 05 - Continue to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADMs and evaluate at-sea.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2343 Tactical METOC Applications

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2002	FY 2003	FY 2004	FY 2005
President's Budget	8.056	8.255		
Current BES/President's Budget	7.606	8.068	6.553	7.120
Total Adjustments	-0.450	-0.187		
Summary of Adjustments				
Sec. 313. PL 107-206: Revised Economic Assumption	(0.017)	-		
Business Process Reform (SEC. 8100)	-	(0.033)		
Economic Assumptions (SEC. 8135)	(0.022)	(0.046)		
IT Cost Growth (SEC. 8109)	-	(0.015)		
FY2002 SBIR	(0.195)	-		
Sec 8123: Management Reform Initiative	(0.071)	-		
FY03 FFRDC reduction Sec. 8029, P.L. 107-248	-	(0.005)		
Miscellaneous Department Adjustments	(0.145)	(0.088)		
Subtotal	-0.450	-0.187	0.000	0.000

(U) Schedule:

Not applicable.

(U) Technical:

Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2343 Tactical METOC Applications

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). TESS/NITES will incorporate METOC data applications.

(U) E. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the METOC Data Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments, meteorology and oceanography , all with management oversight by SPAWAR Headquarters PMW 155.

(U) F. MAJOR PERFORMERS:

N/A

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME X2343 Tactical METOC Applications						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software Development	WX	NUWC	1.400	0.000	N/A	0.000	N/A	0.000	N/A		1.400	
	WX	SSC SD	1.855	0.600	N/A	0.320	N/A	0.335	N/A	CONT	CONT	
	WX	NRL	1.079	0.412	N/A	0.270	N/A	0.285	N/A	CONT	CONT	
	CP	NAVSEA	19.200	6.155	N/A	5.258	N/A	6.211	N/A	CONT	CONT	
	CP	LOCKHEAD	1.053	0.000	N/A	0.000	N/A	0.000	N/A		1.053	
	N/A	MISC	4.223	0.901	N/A	0.705	N/A	0.289	N/A	CONT	CONT	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Product Development			28.810	8.068		6.553		7.120		0.000	50.551	
Remarks:												
	CP	IPD	0.595	0.000	N/A	0.000	N/A	0.000	N/A	CONT	#VALUE!	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			0.595	0.000		0.000		0.000		CONT	CONT	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2343 Tactical METOC Applications						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			29.405	8.068		6.553		7.120		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

EXHIBIT R4, Schedule Profile

DATE: **February 2003**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-4**

PROGRAM ELEMENT NUMBER AND NAME: PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME: X2343 Tactical METOC Applications

Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EM/EO Decision Aids		EOTDA				AREPS				TAWS			Adv EM/EO using AI								Next Gen EM/EO Adv EM/EO using AI											
		DEM/VAL				**DEM/VAL**				**DEM/VAL**			**DEM/VAL**													**DEM/VAL**						
Mine Warfare TDAs		MEDAL								MEDAL Upgrades			MEDAL Upgrades								NEXGEN MIW TDA										
			DEM/VAL								**DEM/VAL**				**DEM/VAL**								**DEM/VAL**				**DEM/VAL**					
TDA COTS Visualization		3D VIS				4D VIS							Advanced VIS								Advanced Interactive Holographic Techniques										
						DEM/VAL							**DEM/VAL**				**DEM/VAL**				**DEM/VAL**							**DEM/VAL**					
Platform Vulnerability		Surface Ship Vul				Acoustic Vul							Non-Acoustic Vul								Multi-Ship Vul							Remote Sensing			
										DEM/VAL							**DEM/VAL**				**DEM/VAL**										
Sensor Interface Capabilities		Real-time Monitoring								Conventional Measurements											Remote Sensing/Data Monitoring										
						DEM/VAL											**DEM/VAL**											**DEM/VAL**					

R-1 SHOPPING LIST - Item No. 35

* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2343 Tactical METOC Applications			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
EM/EO Decision Aids	4Q	4Q	4Q		1Q			3Q
Mine/Littoral Warfare TDAs	3Q		1Q	2Q	3Q		1Q	2Q
TDA COTS Visualization		1Q	3Q	4Q	4Q		2Q	3Q
Platform Vulnerability	4Q		4Q		3Q		2Q	4Q
Sensor Interface Capabilities			1Q			1Q		3Q

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications					PROJECT NUMBER AND NAME X2344 Precise Timing and Astrometry					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Project Cost	**4.208**	**1.419**	**1.443**	**1.161**	**1.265**	**1.302**	**1.576**	**1.606**	**1.636**	**Continuing**	**Continuing**
RDT&E Articles Qty											**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The major thrusts of the Precise Timing and Astrometry Project in direct support of the U.S. Naval Observatory (USNO) are to: 1) address DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions (including objects at other than optical wavelengths) and the stellar inertial reference system (to which all navigation, guidance, and positioning systems are ultimately referred); 2) develop techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) oversee the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) develop advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies. DoD Instruction 5000.2 assigns to the Navy the responsibility for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD Services, Federal agencies, and related scientific laboratories. The Navy is also responsible for providing astronomical data for navigation, positioning, and guidance, including space. Some operational and many emerging requirements surpass current support capabilities. In response to these DoD requirements, this project transitions Research (6.1) and Exploratory Development (6.2) efforts, as well as developments in the civilian sector, into the operational capabilities and products of the USNO.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2344 Precise Timing and Astrometry

(U) B. Accomplishments/Planned Program

Time Transfer	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.375	0.390	0.292	0.355
RDT&E Articles Quantity				

FY02 - Continued development of next-generation time transfer capabilities.
FY03 - Complete development of next-generation time transfer capabilities. Spiral development of time transfer techniques incorporating neural networks to improve accuracy.
FY04 to FY05 - Continue development of time transfer techniques incorporating neural networks to improve accuracy.

Earth Orientation	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.425	0.430	0.338	0.375
RDT&E Articles Quantity				

FY02 - Continued VLBI/GPS demonstration for earth orientation parameters.
FY03 -04 - Continue VLBI/GPS demonstration for earth orientation parameters.
FY05 - Complete VLBI/GPS demonstration for earth orientation parameters. Spiral development of next-generation earth orientation techniques.

Master Clock	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.619	0.623	0.531	0.535
RDT&E Articles Quantity				

FY02 - Continued exploitation of emergent Master Clock technologies.
FY03 - FY05 - Continue exploitation of emergent Master Clock technologies.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2344 Precise Timing and Astrometry

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2002	FY 2003	FY 2004	FY 2005
President's Budget	1.505	1.476		
Current BES/President's Budget	1.419	1.443	1.161	1.265
Total Adjustments	-0.086	-0.033		
Summary of Adjustments				
Sec. 313. PL 107-206: Revised Economic Assumption	(0.003)			
Business Process Reform (SEC. 8100)		(0.006)		
Economic Assumptions (SEC. 8135)	(0.004)	(0.008)		
IT Cost Growth (SEC. 8109)		(0.003)		
FY02 Actuals (30 Sept)				
Sec 8123: Management Reform Initiative	(0.013)			
FY2002 SBIR	(0.039)			
Miscellaneous Department Adjustments	(0.027)	(0.016)		
Subtotal	-0.086	-0.033	0.000	0.000

(U) Schedule:

Not applicable.

(U) Technical:

Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X2344 Precise Timing and Astrometry

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable.

(U) E. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the the Precise Timing and Astrometry Project in direct support of the U.S. Naval Observatory (USNO) in: 1) addressing DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions and the stellar inertial reference system ; 2) developing techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) overseeing the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) developing advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies, all with management oversight by SPAWAR Headquarters.

(U) F. MAJOR PERFORMERS:

N/A

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2344 Precise Timing and Astrometry						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software Development	WX	Naval Observatory	5.567	1.443	N/A	1.161	N/A	1.265	N/A	CONT	CONT	
	N/A	MISC	0.094	0.000	N/A	0.000	N/A	0.000	N/A		0.094	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Software Development			5.661	1.443		1.161		1.265		0.000	9.530	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2344 Precise Timing and Astrometry						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			5.661	1.443		1.161		1.265		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

EXHIBIT R4, Schedule Profile

DATE: **February 2003**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-4**

PROGRAM ELEMENT NUMBER AND NAME: PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME: X2344 Precise Timing and Astrometry

Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Time Transfer		GPS time transfer				**DEM/VAL**		▲		Neural Networks				**DEM/VAL**		▲						Advanced Time Transfer				**DEM/VAL**				▲		
Earth Orientation			VLBI/GPS demo				**DEM/VAL**				▲			Full-Sky Astrometric Mapping Explorer									**DEM/VAL**				▲						
Master Clock	Cesium Evaluation			**DEM/VAL**		▲		Sigma Tau-model hydrogen masers						**DEM/VAL**				▲		Mercury Ion Clocks			**DEM/VAL**			▲		Pulsar Profile Technology				

R-1 SHOPPING LIST - Item No. 35

* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail					DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X2344 Precise Timing and Astrometry			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Time Transfer		4Q		4Q				2Q
Earth Orientation			4Q				2Q	
Master Clock		2Q			1Q		1Q	

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications					PROJECT NUMBER AND NAME X9168 Prototype Regional Forecast Hub					
COST ($ in Millions)	Prior Years Cost	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Program
Project Cost	**0.000**	**0.000**	**1.223**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**1.223**
RDT&E Articles Qty											**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The thrust of this project is to develop, integrate and demonstrate a prototype Prototype Regionsal Forecast (PRF) Hub. Currently there is no Regional Forecast Hub for METOC modeling in support of the CNMOC Centers of Excellence. This system will provide the tools for substantially reducing the time to develop, prototype, test, and validate METOC models, and will support collaboration between modelers and users. The PRF will integrate and demonstrate new technologies and techniques to allow the Navy to establish more efficient forecasting hubs to respond to geographically distributed operational needs of the Department of the Navy including air and water born contaminants. The PRF will:

· Provide Navy's operational personnel and forecasters at dispersed locations with Web based access to regionally specific numerical forecasts of both the oceanographic and meteorological conditions.

· Incorporate computer models, high performance computing, including hardware, software and databases, and communications into a single architecture.

· Use advanced communications technology such as the NCSA Access Grid to allow forecasters and decision support personal to meet in a virtual room with collaborative access to the latest METOC conditions and forecasts.

· Integrate a suite of high-resolution ocean and atmospheric forecast and contaminant dispersion/ transport models. The SRC will require the development and incorporation of an adaptive refinement ocean model with chemical tracking capabilities.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X9168 Prototype Regional Forecast Hub

(U) B. Accomplishments/Planned Program

Prototype Regional Forecast Hub	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost		1.223		
RDT&E Articles Quantity				

FY03 - Development, integration and demonstration of a prototype PRF Hub.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost				
RDT&E Articles Quantity				

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost				
RDT&E Articles Quantity				

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X9168 Prototype Regional Forecast Hub

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget:	0.000	0.000	0.000	0.000
Current BES/President's Budget	0.000	1.223	0.000	0.000
Total Adjustments	0.000	1.223	0.000	0.000
Summary of Adjustments				
Prototype Regional Forecast Hub	-	1.250	-	-
Economic Assumptions (SEC. 8135)	-	(0.007)	-	-
IT Cost Growth (SEC. 8109)	-	(0.002)	-	-
Miscellaneous Department Adjustments	-	(0.013)	-	-
Business Process Reform (Sec. 8100)		(0.005)		
Subtotal	0.000	1.223	0.000	0.000

(U) Schedule:

Not applicable.

(U) Technical:

Not applicable.

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	X9168 Prototype Regional Forecast Hub

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable.

(U) E. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the Prototype Regional Forecast Hub. The PRF Hub will integrate and demonstrate new technologies and techniques to allow the Navy to establish more efficient forecasting hubs to respond to geographically distributed operational needs of the Department of the Navy including air and water born contaminants.

(U) F. MAJOR PERFORMERS:

N/A

R-1 SHOPPING LIST - Item No. 35

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X9168 Prototype Regional Forecast Hub						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software Development	WX	NAVOCEANO	0.000	1.223	N/A	0.000	N/A	0.000	N/A	0.000	1.223	
	N/A	MISC	0.000	0.000	N/A	0.000	N/A	0.000	N/A		0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Software Development			0.000	1.223		0.000		0.000		0.000	1.223	
Remarks:												
											0.000	
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											0.000	
											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		CONT	CONT	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X9168 Prototype Regional Forecast Hub						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
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											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.000	1.223		0.000		0.000		CONT	CONT	
Remarks:												

R-1 SHOPPING LIST - Item No. 35

EXHIBIT R4, Schedule Profile																																DATE: February 2003
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**									PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications														PROJECT NUMBER AND NAME X9168 Prototype Regional Forecast Hub											
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Prototype Regional Forecast Hub					DEM/VAL																											

R-1 SHOPPING LIST - Item No. 35

* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail					DATE: **February 2003**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME X9168 Prototype Regional Forecast Hub			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Prototype Regional Forecast Hub		4Q						

R-1 SHOPPING LIST - Item No. 35